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Object and Action Processing in Alzheimer's Disease: The Embodied View of Cognition

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In the literature there are conflicting reports concerning whether object and action processing differ in patients with Alzheimer's disease (AD). A number of researchers have pointed out that neither objects nor actions should be treated as uniform categories (e.g., Martin, 2007; Jonkers & Bastiaanse, 2007). With respect to word processing in AD, the importance of subdivisions of these categories according to semantic features, such as living vs. non-living objects or actions with an instrument vs. actions without an instrument has been demonstrated (e.g., Almor et al., 2009).

In the current study we explore the importance of semantic features by studying word processing for various categories of objects and actions. The hypotheses are based on the embodied cognition framework, which states that semantic knowledge is partly grounded in sensorimotor systems. According to this theory, different semantic features of objects and actions relate to the different neuroanatomical distribution underlying networks for various categories of nouns and verbs.

We tested 24 healthy English-speaking elderly (ages 67-83, m=73.4) and 8 individuals with AD (ages 70-91, m=82.8) via a semantic similarity judgment task on different categories within objects and actions. Each item consisted of three words (e.g., carve: cut - crush); participants were to decide which of the final two words was most related to the first. No correlation was presentbetween age and accuracy or age and reaction time.

Overall, the controls performed faster ($p=.003$), but not significantly more accurately ($p=.221$) than the AD group. Accuracy and reaction time measures distinguished among object and action categories, with similarities and differences between the two groups. For example, *hitting* was the fastest verb category for both groups, whereas *cutting* was faster than *change of state* for the control group, but the opposite was obtained for participants with AD. The lack of differences seen among object categories for participants with AD is probably the result of the small number of participants and items per category and the great interindividual variability in performance, since even for the controls a significant difference was seen among object categories in both accuracy ($p=0.015$) and reaction time ($p<0.001$).

In sum, these findings are consistent with the embodied cognition approach in that the action categories with semantic features in brain regions particularly affected in AD (i.e., ventral temporal cortex (*change of state*), posterolateral temporal cortex (*motion*) and intraparietal sulcus/inferior parietal lobule (*contact*)) seem to be more difficult to process than categories with features in non-affected regions.

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In addition, these results strongly suggest the influence of different categories within objects and actions which should be considered in future studies.

References

Almor, A., Arnoff, J. M., MacDonald, M. C., Gonnerman, L. M., Kempler, D., Hintiryan, H., Hayes, U. L., Arunachlam, S., & Anderson, E.S. (2009). A common mechanism in verb and noun naming deficits in Alzheimer's patients. *Brain and Language, 11*,8-19.

Jonkers, R., & Bastiaanse, R. (2007). Action naming in anomic speakers: Effects of instrumentality and name relation. *Brain and Language, 102*,262-272.

Martin, A. (2007). The representation of object concepts in the brain. *Annual Review of Psychology, 58,* 25-45.